

Haddock (*Melanogrammus aeglefinus*) in Division 6.b (Rockall)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2022 should be no more than 5825 tonnes.

ICES notes the existence of a precautionary management plan, developed and adopted by some of the relevant management authorities for this stock.

Stock development over time

Fishing pressure on the stock is above F_{MSY} but below, F_{pa} and F_{lim} ; spawning-stock size is above $MSY B_{trigger}$, B_{pa} , and B_{lim} .

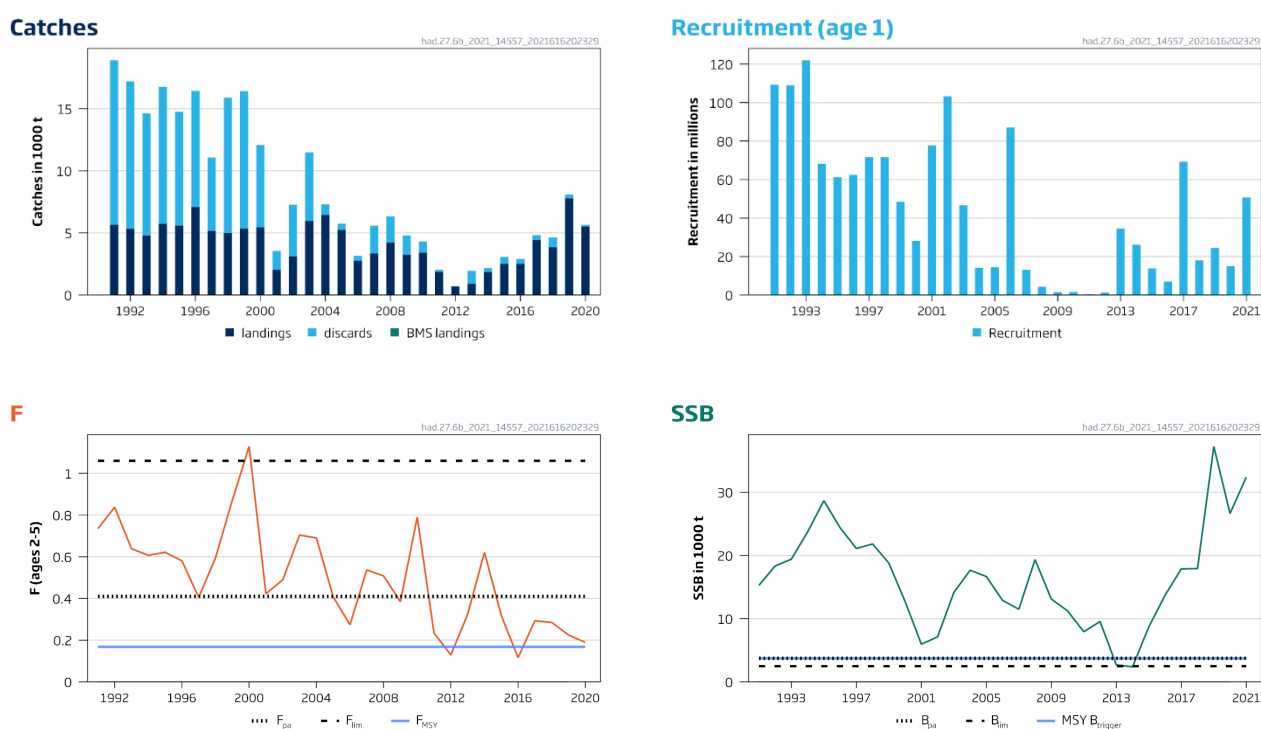


Figure 1 Haddock in Division 6.b. Summary of the stock assessment.

Catch scenarios

Table 1 Haddock in Division 6.b. Assumptions made for the interim year and in the forecast.

| Variable | Value | Notes |
|---------------------------|--------|---|
| $F_{ages2-5}$ (2021) | 0.233 | $F_{2021} = F_{average}$ (2018–2020) |
| SSB 2022 | 29 717 | Fishing at F_{2021} ; in tonnes. |
| $R_{age 1}$ (2021) | 50 739 | Survey estimate in 2020 (RCT3); in thousands. |
| $R_{age 1}$ (2022) | 13832 | Recruitment corresponding to the 25th percentile rank of the recruitment time-series; in thousands. |
| Catch (2021) | 6999 | Fishing at F_{2021} ; in tonnes. |
| Projected landings (2021) | 6136 | Assuming average landing patterns (2011–2020); in tonnes. |
| Projected discards (2021) | 863 | Assuming average discard patterns (2011–2020); in tonnes. |

Table 2[†] Haddock in Division 6.b. Annual catch scenarios. All weights are in tonnes. No information on % TAC change is shown because the TAC area differs from the stock distribution area.

| Basis | Total catch (2022) | Projected landings (2022) | Projected discards (2022) | F _{total} (2022) | F _{projected landings} (2022) | F _{projected discards} (2022) | SSB (2023) | % SSB change* | % advice change [^] |
|--|--------------------|---------------------------|---------------------------|---------------------------|--|--|------------|---------------|------------------------------|
| ICES advice basis | | | | | | | | | |
| MSY approach: F _{MSY} | 5825 | 5052 | 773 | 0.168 | 0.135 | 0.033 | 44783 | 51 | -6.6 |
| Other scenarios | | | | | | | | | |
| NEAFC proposed management strategy 1 ^{^^} | 5908 | 5124 | 784 | 0.171 | 0.137 | 0.0335 | 44678 | 50 | -5.3 |
| NEAFC proposed management strategy 2 ^{^^^} | 5825 | 5052 | 773 | 0.168 | 0.135 | 0.033 | 44783 | 51 | -6.6 |
| F = 0 | 0 | 0 | 0 | 0 | 0 | 0 | 52100 | 75 | -100 |
| F _{pa} | 12774 | 11040 | 1734 | 0.41 | 0.33 | 0.0805 | 36113 | 22 | 105 |
| F _{lim} | 25411 | 21770 | 3641 | 1.06 | 0.85 | 0.208 | 20605 | -31 | 307 |
| SSB ₂₀₂₃ = B _{lim} | 41377 | 34623 | 6754 | 3.80 | 3.05 | 0.7439 | 2474 | -92 | 563 |
| SSB ₂₀₂₃ = B _{pa} = MSY B _{trigger} | 40118 | 33680 | 6438 | 3.23 | 2.60 | 0.6346 | 3712 | -88 | 543 |
| SSB ₂₀₂₃ = SSB ₂₀₂₂ | 17947 | 15462 | 2485 | 0.63 | 0.51 | 0.1241 | 29717 | 0 | 188 |
| F = F ₂₀₂₁ | 7954 | 6902 | 1052 | 0.23 | 0.187 | 0.046 | 42684 | 44 | 27 |
| F = MAP # F _{MSY lower} | 3745 | 3251 | 494 | 0.105 | 0.084 | 0.021 | 47391 | 59 | -40 |
| F = MAP # F _{MSY upper} | 8944 | 7746 | 1198 | 0.27 | 0.22 | 0.053 | 40883 | 38 | 43 |

* SSB 2023 relative to SSB 2022.

[^] Advice value for 2022 relative to the advice value for 2021 (6239 tonnes).

^{^^} TAC_{HCR} is derived from a two-step process: F_{MSY} = 0.168 followed by the TAC constraint “a”, where the TAC₂₀₂₂ = TAC_{FMSY} + 0.2 × (TAC₂₀₂₁ - TAC_{FMSY}). To calculate the catch scenario of the proposed management strategy, ICES uses the advised catches for 2021 as the TAC₂₀₂₁; the formula for TAC₂₀₂₂, therefore, corresponds to catches of 5825 + 0.2 × (6239 - 5825) = 5908 tonnes.

^{^^^} MSY with TAC constraint “b”, which implies no more than 20% below or 25% above of the TAC of preceding year (TAC_{y-1}).

EU multiannual plan (MAP) for the Western Waters (EU, 2019).

The advice for 2022 is lower than the advice for 2021 because the perception of the stock has been revised downwards.

Basis of the advice

Table 3 Haddock in Division 6.b. The basis of the advice.

| Advice basis | MSY approach |
|-----------------|--|
| Management plan | <p>There is no agreed management plan for haddock in this area. Two management strategies (NEAFC and EU MAP) have been assessed to be precautionary. NEAFC has requested ICES to evaluate the harvest control rules (HCRs) that use F_{MSY} as a target. ICES concluded that the NEAFC HCRs in the long-term management strategy for Rockall haddock were consistent with the precautionary approach (ICES, 2019a).</p> <p>ICES is aware of the multiannual management plan (MAP) which has been adopted by the EU for this stock (EU, 2019) and which ICES considers to be precautionary. There is no agreed shared management plan with UK for this stock, and ICES provides advice according to ICES MSY approach. Catch scenarios consistent with the MAP F_{MSY} ranges are provided.</p> |

Quality of the assessment

Recent assessments have revised SSB downwards, while F has been revised upwards in 2018–2020.

At-sea observer sampling for discards remains sparse for Rockall haddock, which leads to uncertainty in fishery selectivity patterns and catch estimates data used in the assessment. The assessment model used (FLXSA) assumes catch is measured with no uncertainty and so does not account for this sampling issue.

[†] Version 2: Addition of the F_{MSY lower} scenario.

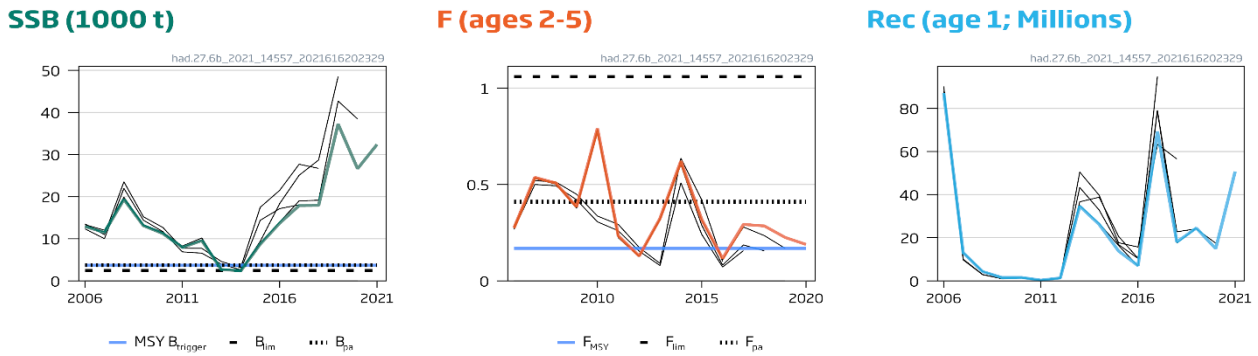


Figure 2 Haddock in Division 6.b. Historical assessment results. Historical assessment results (final-year SSB and recruitment estimates included). The assessment was benchmarked in 2019 (ICES, 2020).

Issues relevant for the advice

ICES provides advice based on the MSY approach because no existing precautionary management plan has been agreed by the relevant management authorities (EU, UK, and NEAFC). Catch options associated with the EU MAP and NEAFC management strategies are included in Table 2.

The spawning–stock biomass is projected to increase significantly in 2023 because the large 2020 year-class (age 1 in 2021) will all become mature.

Reference points

Table 4 Haddock in Division 6.b. Reference points, values, and their technical basis.

| Framework | Reference point | Value | Technical basis | Source |
|------------------------|--------------------------|-------|--|---------------------|
| MSY approach | MSY $B_{trigger}$ | 3712 | B_{pa} ; in tonnes. | ICES (2019a) |
| | F_{MSY} | 0.168 | Segmented regression with B_{loss} , the lowest observed SSB (EqSim) | ICES (2019a) |
| Precautionary approach | B_{lim} | 2474 | $B_{lim} = B_{loss} = SSB$ in 2014, the lowest observed spawning–stock estimated in previous assessments; in tonnes. | ICES (2019a) |
| | B_{pa} | 3712 | $B_{pa} = B_{lim} \times 1.4$. This is considered to be the minimum SSB required to obtain a high probability (95%) of maintaining SSB above B_{lim} ; in tonnes. | ICES (2019a) |
| | F_{lim} | 1.06 | Based on a 50% probability of being above B_{lim} in a stochastic simulation with a segmented regression using breakpoint at B_{lim} | ICES (2019a) |
| | F_{pa} | 0.41 | F_{POS} ; the F that leads to $SSB \geq B_{lim}$ with 95% probability | ICES (2019a, 2021a) |
| Management plan* | SSB_{mgt} | 372 | B_{pa} ; in tonnes. | ICES (2019a) |
| | F_{mgt} | 0.168 | F_{MSY} | ICES (2019a) |
| Management plan** | MAP MSY $B_{trigger}$ | 3712 | MSY $B_{trigger}$; in tonnes. | ICES (2019a) |
| | MAP B_{lim} | 2474 | B_{lim} ; in tonnes. | ICES (2019a) |
| | MAP F_{MSY} | 0.168 | F_{MSY} | ICES (2019a) |
| | EU MAP range F_{lower} | 0.105 | Consistent with range resulting in no more than 5% reduction in long-term yield compared with MSY (see methods in ICES (2016)) | ICES (2019a) |
| | EU MAP range F_{upper} | 0.27 | Consistent with range resulting in no more than 5% reduction in long-term yield compared with MSY (see methods in ICES (2016)). | ICES (2019a) |

* Proposed NEAFC multiannual plan (MAP).

** The EU multiannual plan (MAP) for stocks in the Western Waters and adjacent has been agreed by the EU for this stock (EU, 2019).

Basis of the assessment

Table 5 Haddock in Division 6.b. Basis of the assessment and advice.

| | |
|--------------------------|--|
| ICES stock data category | 1 (ICES, 2021b) |
| Assessment type | Age-structured model (FLXSA) that uses catches in the model and in the forecast (ICES, 2021a) |
| Input data | Commercial landings, estimated discards, age composition of catches; one survey index (Rock-WIBTS-Q3 [G4436]); fixed maturity ogive (knife-edge at age 3), fixed natural mortality (0.2) |
| Discards and bycatch | Discards are included in the assessment |
| Indicators | Russian trawl-acoustic survey and the trawl survey-based assessment, statistical catch-at-age analysis (StatCam analytical model) and SAM assessment |
| Other information | This stock was benchmarked in 2019 (ICES, 2020) |
| Working group | Working Group for the Celtic Seas Ecoregion (WGCSE) |

History of the advice, catch, and management

Table 6 Haddock in Division 6.b. ICES advice and official landings. All weights are in tonnes.

| Year | ICES advice, with single-stock exploitation boundaries from 2004 onwards | Catch corresponding to advice | Landings corresponding to advice | Agreed TAC ^{^^} | Official landings | ICES landings | Discards |
|------|--|-------------------------------|----------------------------------|--------------------------|-------------------|---------------|----------|
| 1987 | Precautionary TAC | 10000 | | | 7995 | 8432 | n/a |
| 1988 | Precautionary TAC | 10000 | | | 7574 | 7929 | n/a |
| 1989 | <i>Status quo</i> F; TAC | 18000 | | | 6643 | 6728 | n/a |
| 1990 | Precautionary TAC | 5500 | | | 8213 | 3884 | n/a |
| 1991 | Precautionary TAC | 5500 | | | 5853 | 5656 | 13228 |
| 1992 | Precautionary TAC | 3800 | | | 4520 | 5321 | 11871 |
| 1993 | 80% of F (91) | 3000 | | | 4113 | 4781 | 9853 |
| 1994 | If required, precautionary TAC | - | | | 3735 | 5732* | 11023 |
| 1995 | No long-term gain in increasing F | 5100** | | | 5491 | 5587 | 9168 |
| 1996 | No long-term gains in increasing F | 6900** | | | 6818 | 7072 | 9356 |
| 1997 | No advice given | 4900** | | | 5220 | 5167 | 5894 |
| 1998 | No increase in F | 4900 | | | 5098 | 4986 | 10862 |
| 1999 | Reduce F below F_{pa} | 3800 | - | | 5990 | 5356 | 11062 |
| 2000 | Reduce F below F_{pa} | < 3500 | - | | 5688 | 5445 | 6609 |
| 2001 | Reduce F below F_{pa} | < 2700 | - | | 2315 | 2020 | 1535 |
| 2002 | Reduce F below 0.2 | < 1300 | - | | 3037 | 3118 | 4152 |
| 2003 | Lowest possible F | - | - | | 6148 | 5968 | 5521 |
| 2004 | Lowest possible catch [^] | | - | 702 | 6306 | 6434 | 883 |
| 2005 | Lowest possible catch [^] | | - | 702 | 5178 | 5239 | 505 |
| 2006 | Lowest possible catch [^] | | - | 597 | 2765 | 2756 | 386 |
| 2007 | Reduce F below F_{pa} [^] | < 7110 | - | 4615 | 3349 | 3347 | 2242 |
| 2008 | Keep F below F_{pa} [^] | < 10600 | - | 6916 | 4221 | 4222 | 2100 |
| 2009 | No long-term gains in increasing F [^] | - | < 4300 | 5879 | 3445 | 3241 | 1557 |
| 2010 | No long-term gains in increasing F [^] | - | < 3300 | 4997 | 3405 | 3404 | 306 |
| 2011 | See scenarios | - | | 3748 | 1903 | 1860 | 152 |
| 2012 | MSY approach | - | < 3300 | 3300 | 710 | 686 | 16 |
| 2013 | No directed fisheries, minimize bycatch and discards | 0 | 0 | 990 | 826 | 889 | 1143 |
| 2014 | MSY approach | < 1620 | < 980 | 1210 | 1675 | 1845 | 274 |

| Year | ICES advice, with single-stock exploitation boundaries from 2004 onwards | Catch corresponding to advice | Landings corresponding to advice | Agreed TAC^^ | Official landings | ICES landings | Discards |
|------|--|-------------------------------|----------------------------------|--------------|-------------------|---------------|----------|
| 2015 | MSY approach | < 4310 | < 2930 | 2580 | 2445 | 2510 | 527 |
| 2016 | MSY approach | ≤ 3932 | ≤ 3225 | 3225 | 2585 | 2504 | 301 |
| 2017 | MSY approach | ≤ 4690 | ≤ 4130 | 4690 | 4610 | 4430 | 396 |
| 2018 | MSY approach | ≤ 5163 | | 5163 | 3868 | 3850 | 788 |
| 2019 | MSY approach | ≤ 10469 | | 10469 | 7686# | 7782^^^ | 302 |
| 2020 | MSY approach | ≤ 10472 | | 10472 | 5401# | 5512^^^ | 131 |
| 2021 | MSY approach | ≤ 6239 | | 8375 | | | |
| 2022 | MSY approach | ≤ 5825 | | | | | |

* Including misreporting.

** Landings at *status quo* F.

^ Single-stock boundary and the exploitation of this stock should be conducted in the context of mixed fisheries, protecting stocks outside safe biological limits.

^^ Agreed EU and UK TAC for Division 6.b and subareas 12 and 14.

^^^ Including below minimum size (BMS) landings.

Preliminary.

n/a = Not available.

History of the catch and landings

Table 7 Haddock in Division 6.b. Catch distribution by fleet in 2020 as estimated by ICES.

| Catch = | Landings* | | Discards |
|-------------|----------------------|------------------|------------|
| 5643 tonnes | Otter trawl > 99% | Longline < 1% | 131 tonnes |
| | 5512 tonnes | | |

*Including BMS landings.

Table 8 Haddock in Division 6.b. History of commercial catch and landings. All weights are in tonnes.

| Year ¹ | Faroe islands | France | Iceland | Ireland | Norway | Portugal | Russian Federation | Spain | UK (E, W, & NI) | UK (Scot.) | Total | Unallocated catch | Landings from NEAFC area | ICES landings estimate |
|-------------------|---------------|--------|---------|---------|--------|----------|--------------------|-------|-----------------|---------------------|---------------------|-------------------|--------------------------|------------------------|
| 1996 | - | -** | - | 747 | 24 | - | - | 1 | 293 | 5753 | 6818 | -543 | n/a | 6275 |
| 1997 | - | - | + | 895 | 24 | - | - | 22 | 165 | 4114 | 5220 | -591 | n/a | 4629 |
| 1998 | - | - | - | 704 | 40 | 4 | - | 21 | 561 | 3768 | 5098 | -599 | n/a | 4499 |
| 1999 | - | - | 167 | 1021 | 61 | - | 458 | 25 | 288 | 3970 | 5990 | -851 | n/a | 5139 |
| 2000 | n/a | 5 | - | 824 | 152 | - | 2154 | 47 | 36 | 2470 | 5688 | -357 | n/a | 5331 [^] |
| 2001 | n/a | 2 | - | 357 | 70 | - | 630 | 51 | - | 1205 | 2315 | -279 | n/a | 2036 [^] |
| 2002 | - | - | - | 206 | 49 | - | 1630 | 7 | - | 1145 | 3037 | 299 | n/a | 3336 [^] |
| 2003 | - | 1 | - | 169 | 60 | - | 4237 | 19 | 56 | 1607 | 6148 | 94 ^{^^} | n/a | 6242 [^] |
| 2004 | - | - | - | 19 | 32 | - | 5844 | - | - | 411 ^{***} | 6306 | 139 ^{^^} | n/a | 6445 |
| 2005 | - | - | - | 105 | 33 | - | 4708 | - | - | 332 ^{***} | 5178 | 1 | n/a | 5179 |
| 2006 | 2 | - | - | 41 | 123 | - | 2154 | 5 | - | 440 ^{***} | 2765 | 0 | n/a | 2765 |
| 2007 | 2 | - | - | 338 | 84 | - | 1282 | - | - | 1643 ^{***} | 3349 | 0 | n/a | 3349 |
| 2008 | 16 | - | - | 721 | 36 | - | 1669 | - | - | 1779 ^{***} | 4221 | 0 | n/a | 4221 |
| 2009 | 16 | - | - | 352 | 71 | - | 55 | - | - | 2951 ^{***} | 3445 | 0 | n/a | 3445 |
| 2010 | 42 | - | - | 169 | 65 | - | 198 | - | - | 2931 ^{***} | 3405 | 0 | n/a | 3405 |
| 2011 | 2 | < 1 | - | 123 | 40 | - | - | - | - | 1738 ^{***} | 1903 | 0 | n/a | 1903 |
| 2012 | 53 | - | - | 31 | 48 | - | 1 | - | - | 577 ^{***} | 710 | 0 | 26 | 710 |
| 2013 | - | - | - | 105 | 121 | - | 4 | - | - | 596 | 826 | 0 | 91 | 826 |
| 2014 | 1 | 2 | - | 95 | 38 | - | 388 | - | - | 1152 | 1675 | 0 | 86 | 1675 |
| 2015 | 1 | - | - | 190 | 66 | - | 136 | - | - | 2052 | 2445 | 0 | 202 | 2445 |
| 2016 | - | - | - | 362 | 63 | - | - | - | - | 2160 | 2585 ^{^^^} | 0 | 624 | 2585 ^{^^^} |
| 2017 | - | - | - | 500 | 26 | - | 153 | - | - | 3930 | 4610 | 0 | 309 | 4610 |
| 2018 | - | - | - | 433 | 16 | - | - | - | - | 3418 | 3868 | 0 | 494 | 3868 |
| 2019* | - | 8 | - | 888 | 13 | - | 245 | 1 | - | 6542 | 7686 ^{^^^} | 0 | 804 | 7782 ^{^^^} |
| 2020* | - | 2 | - | 679 | 14 | - | 133 | - | - | 4573 | 5401 ^{^^^} | 0 | 791 | 5512 ^{^^^} |

* Preliminary official landings.

** Included in Division 6.a.

*** Includes UK England, Wales, and N. Ireland landings.

[^] Includes the total Russian catch.

^{^^} Non-official.

^{^^^} Including below minimum size (BMS) landings.

n/a = Not available.

Summary of the assessment

Table 9 Haddock in Division 6.b. Assessment summary. Weights are in tonnes and recruitment in thousands.

| Year | Recruitment age 1 | SSB | Landings** | BMS Landings | Discards | F ages (2–5) |
|------|-------------------|-------|------------|--------------|----------|--------------|
| 1991 | 109360 | 15262 | 5656 | | 13240 | 0.73 |
| 1992 | 109018 | 18330 | 5321 | | 11878 | 0.84 |
| 1993 | 122000 | 19413 | 4781 | | 9858 | 0.64 |
| 1994 | 68239 | 23717 | 5732 | | 11030 | 0.61 |
| 1995 | 61263 | 28673 | 5587 | | 9173 | 0.62 |
| 1996 | 62421 | 24381 | 7072 | | 9365 | 0.58 |
| 1997 | 71666 | 21100 | 5167 | | 5900 | 0.41 |
| 1998 | 71678 | 21820 | 4986 | | 10903 | 0.59 |
| 1999 | 48438 | 18792 | 5356 | | 11066 | 0.87 |
| 2000 | 28113 | 12719 | 5445 | | 6637 | 1.13 |
| 2001 | 77850 | 5957 | 2020 | | 1536 | 0.42 |
| 2002 | 103304 | 7124 | 3118 | | 4158 | 0.49 |
| 2003 | 46702 | 14136 | 5968 | | 5522 | 0.70 |
| 2004 | 14155 | 17658 | 6434 | | 883 | 0.69 |
| 2005 | 14462 | 16666 | 5239 | | 505 | 0.41 |
| 2006 | 87139 | 12890 | 2756 | | 386 | 0.27 |
| 2007 | 13054 | 11497 | 3347 | | 2242 | 0.54 |
| 2008 | 4312 | 19346 | 4222 | | 2104 | 0.51 |
| 2009 | 1564 | 13098 | 3241 | | 1556 | 0.38 |
| 2010 | 1588 | 11223 | 3404 | | 907 | 0.79 |
| 2011 | 340 | 7926 | 1860 | | 152 | 0.23 |
| 2012 | 1355 | 9554 | 686 | | 29 | 0.129 |
| 2013 | 34615 | 2688 | 889 | | 1065 | 0.32 |
| 2014 | 26176 | 2378 | 1845 | | 332 | 0.62 |
| 2015 | 13832 | 8706 | 2510 | | 554 | 0.32 |
| 2016 | 7016 | 13694 | 2504 | < 0.5 | 401 | 0.116 |
| 2017 | 69342 | 17871 | 4430 | | 379 | 0.29 |
| 2018 | 18051 | 17927 | 3850 | | 788 | 0.28 |
| 2019 | 24499 | 37243 | 7778 | 4 | 303 | 0.23 |
| 2020 | 14947 | 26630 | 5510 | 2 | 131 | 0.189 |
| 2021 | 50739* | 32393 | | | | |

* Year class strength prediction based on survey estimate in 2020 (RCT3).

** ICES landings estimate without BMS landings

Sources and references

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[Download the stock assessment data and figures.](#)

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